CLAIMS

What is claimed:

1   1.   A method for correcting web deformation during a roll-to roll process

2   comprising:

3   initiating a roll-to-roll process involving a flexible web substrate;

4   detecting deformation in the flexible web substrate during the roll-to-roll process;

5   and

6   dynamically aligning the flexible web substrate based on the detected

7   deformation.

1   2.   The method of claim 1 wherein detecting deformation in the flexible web

2   substrate includes:

3   utilizing optical markings on the flexible web substrate to detect the deformation;

4   comparing the detected deformation with a desired deformation;

5   generating an error signal based on the comparison; and

6   generating a correction signal to be utilized to dynamically align the flexible web

7   substrate.

1   3.   The method of claim 1 wherein dynamically aligning the flexible web

2   substrate includes:

3   utilizing controllable mechanical components to align the flexible web substrate

4   based on the detected deformation.

1   4.   The method of claim 3 wherein the controllable mechanical components

2   include steerable disks.

1   5.   The method of claim 3 wherein the controllable mechanical components

2   include spherical nips.

1   6.   The method of claim 5 wherein each spherical nip includes a spring

2   loaded counter roller.

1   7.   The method of claim 3 wherein the controllable mechanical components

2   include mechanical cross-rollers.

1   8.   A system for correcting web deformation during a roll-to roll process

2   comprising:

3   means for initiating a roll-to-roll process involving a flexible web substrate;

4   means for detecting deformation in the flexible web substrate during the roll-to-

5   roll process; and

6   means for dynamically aligning the flexible web substrate based on the detected

7   deformation.

1   9.   The system of claim 8 wherein the means for detecting deformation in the

2   flexible web substrate includes:

3   means for utilizing optical markings on the flexible web substrate to detect the

4   deformation;

5   means for comparing the detected deformation with a desired deformation;

6   means for generating an error signal based on the comparison; and

7   means for generating a correction signal to be utilized to dynamically align the

8   flexible web substrate.

1   10.   The system of claim 8 wherein the means for dynamically aligning the

2   flexible web substrate includes:

3   means for utilizing controllable mechanical components to align the flexible web

4   substrate based on the detected deformation.

1   11.   The system of claim 10 wherein the controllable mechanical components

2   include steerable disks.

1   12.   The system of claim 10 wherein the controllable mechanical components

2   include spherical nips.

1   13.   The system of claim 12 wherein each spherical nip includes a spring

2   loaded counter roller.

1   14.   The system of claim 10 wherein the controllable mechanical components

2   include mechanical cross-rollers.

1   15.   A roll-to-roll processing system comprising:

2   a web rolling mechanism;

3   a flexible web substrate coupled to the web rolling mechanism;

4   a plurality of sensors configured to dynamically detect deformation in the flexible

5 web substrate;

6   at least one controllable mechanical component coupled to the flexible web

7 substrate; and

8   a computer system coupled to the plurality of sensors and the at least one

9 controllable mechanical component wherein the computer system includes logic for

10   detecting deformation in the flexible web substrate; and

11   dynamically aligning the flexible web substrate based on the detected

12 deformation.

1   16.   The system of claim 15 wherein the logic for detecting deformations in

2 the flexible web substrate includes logic for:

3   utilizing optical markings on the flexible web substrate to detect the deformation;

4   comparing the detected deformation with a desired deformation;

5   generating an error signal based on the comparison; and

6   generating a correction signal to be utilized to dynamically align the flexible web

7 substrate.

1   17.   The system of claim 15 wherein the logic for dynamically aligning the

2 flexible web substrate comprises logic for:

3   utilizing the at least one controllable mechanical component to align the flexible

4 web substrate based on the detected deformation.

1   18.   The system of claim 17 wherein the at least one controllable mechanical

2   component includes steerable disks.

1   19.   The system of claim 17 wherein the at least one controllable mechanical

2   component includes spherical nips.

1   20.   The system of claim 19 wherein each spherical nip includes a spring

2   loaded counter roller.

1   21.   The system of claim 17 wherein the at least one controllable mechanical

2   component includes mechanical cross-rollers.

1   22.   A computer program product for correcting web deformation during a

2   roll-to-roll process wherein the computer program product includes a computer usable

3   medium having computer readable program means for causing a computer to perform the

4   steps of:

5   initiating a roll-to-roll process involving a flexible web substrate;

6   detecting deformation in the flexible web substrate during the roll-to-roll process;

7   and

8   dynamically aligning the flexible web substrate based on the detected

9   deformation.

1   23.   The computer program product of claim 22 wherein detecting

2   deformation in the flexible web substrate includes:

3   utilizing optical markings on the flexible web substrate to detect the deformation;

4   comparing the detected deformation with a desired deformation;

5   generating an error signal based on the comparison; and

6   generating a correction signal to be utilized to dynamically align the flexible web

7   substrate.

1   24.   The computer program product of claim 22 wherein dynamically aligning

2   the flexible web substrate includes:

3   utilizing controllable mechanical components to align the flexible web substrate

4   based on the detected deformation.

1   25.   A method for correcting web deformation during a roll-to roll process

2   comprising:

3   utilizing optical markings on a flexible web substrate to detect a deformation in

4   the flexible web substrate;

5   comparing the detected deformation with a desired deformation;

6   generating an error signal based on the comparison;

7   generating a correction signal to be utilized to dynamically align the flexible web

8   substrate and

9   dynamically aligning the flexible web substrate based on the correction signal.

1   26.   The method of claim 25 wherein dynamically aligning the flexible web

2   substrate further comprises:

3   utilizing controllable mechanical components to align the flexible web substrate

4   based on the correction signal.

1   27.   The method of claim 26 wherein the controllable mechanical components

2   include steerable disks.

1   28.   The method of claim 26 wherein the controllable mechanical components

2   include spherical nips.

1   29.   The method of claim 28 wherein each spherical nip includes a spring

2   loaded counter roller.